

into an air chamber of sufficient dimensions to allow for its expansion. This air chamber is covered with a brick arch, with slits or apertures, in order to equalise the supply and thoroughly diffuse the oxygen of the atmosphere upon the gases given off in the destructive distillation of the coal, which are radiated downwards by a defective arch placed under the bottom of the boiler. Thus, a perfect combination is effected with the different gaseous substances, which are often given off as colourless smoke. The prevention of carbonic oxide is effected, or where such has been formed in the first stage of the process of combustion, it is necessarily burnt, by having an adequate supply of oxygen whilst there is sufficient of the latter for the combustion of carburetted hydrogen, and other gaseous products, the diffusion or formation of black smoke having been previously prevented by the supply of a proper quantity of oxygen, neither too much nor too little.

By these combinations all combustible matters are consumed. The defective arch in my arrangements has the further effect of checking the progress of cold air that enters the feed door whilst firing, and which under average drafts is admitted to travel at fifty miles per hour, but which is highly rarified by its contact with the former. A second bridge impinges the heat direct to the bottom of the boiler, and prevents the too rapid progress of the heated air to the chimney. For steam-boilers I recommend one length of fire bar, but the proportions are so well understood, that it is needless to enter into particulars further than that I prefer a single bar as long as can be conveniently worked, and narrow, according to the proportion of surface required. The fire-brick, as a heating for the boiler, should be sloped back as far as possible, in order to allow for the irradiant heat of the former, and the exposure of as much of the surface of the bottom or legs of the boiler as possible. The fire-bars here shown are a recent improvement. They are not only suited to the common steam-engine furnaces, but can, with equal facility, be applied to the furnaces of marine engines. The principle of the invention consists in moving each alternate bar longitudinally in one direction, whilst the intermediate bars are moving in the opposite direction. This movement, aided by the corrugated surface of the bars, effectually prevents the formation of clinkers, and thus keeps the always perfectly free. The advantages which they secure are very considerable, as coal of an inferior character can be used without the usual effect of choking up the grate. The effects are a very considerable saving in fuel, whilst the draft is considerably improved. In reference to Nos. 4 and 5, there will be seen a double fire-grate, applicable to short boilers and other manufacturing purposes. This double fire-grate produces numerous advantages.—1. A quick combustion is insured.—2. A more regular, steady, and uniform heat produced from a second or coke fire, which, to distillers, brewers, dyers, and all other manufacturing purposes, is of the first consequence, as it not only produces a steady application of heat, but retains the same to a treble extent over furnaces of the ordinary construction, with an economy of double the saving as when applied to steam-engine boilers. To elucidate the difference, it may be stated that a short heat and a long fire requires an entirely different arrangement; a short boiler or pan requires the whole of the heat to be used under the surface of the boiler, whereas a large fire requires the gaseous matter in combustion to be carried round the boiler, in its whole length and flues. To show the expense and time requisite for the adaptation of my patent, I may state that I have lately applied my furnace to boilers of 76-inch cylinder in Cornwall, which I commenced and completed in 12 hours. My terms are to economise fuel to an extent of 8 per cent., or no charge made, in Cornish boilers, where the utmost economy is observed, and to an extent beyond any other part of the world; whilst to other furnaces (according to their construction, &c.) I guarantee a saving of 10, 20, 30, or 40 per cent. I have numerous testimonials to prove this fact from the first manufacturers in Lancashire. In one manufactory at Clithero I have ten steam-boilers on my principle, and in one house in Yorkshire I have licensed thirty in one establishment. I am desirous to call the attention of the British Association to ascertain the fact of the nature and extent of heat given off in the combustion of the different gases, which are separated in the destructive distillation of coals, either separately or collectively, more particularly with regard to carbonic oxide. In experiments which I made at London and Liverpool some six years since, the satisfactory results of which in the suppression of smoke were demonstrated to his Royal Highness the Duke of Cambridge, and upwards of 300 scientific men, this question was resolved as perfect; by careful observation, I found that I did not evaporate the quantity of water as I expected, and which I can now do with the same quantity of fuel, by at least

30 per cent. My ideas are, that on the previous occasion I had converted the black smoke or carbon into carbonic oxide, and that thus the power of evaporation was diminished. I consider that my present plan combines all the principles of combustion, uniting or igniting the carbonic oxide with the hydrogen and other gases. I hope that this meeting may consider that the question of the ascertaining the proportion of heat given off in the separate gases is worthy the attention of the "British Association," more particularly as regards carbonic oxide, which I am given to understand is applied in Germany and France; after it leaves the puddling or other furnaces, is collected in flues, and again used under boilers with great economy and effect. It appears from Mr. Taylor's report on experiments made at the last meeting of the British Association, that Mr. Fairbairn's experiment on Mr. Williams's furnace produced a saving of 4 per cent., and that those boilers on which the experiment at Manchester was made, consumed 10 cwt. of coal per horse, whereas the boilers in Cornwall only consumed 2½ cwt. My recent visit into Cornwall has enabled me to examine the various boilers at Cornbreia mines, and I have undertaken to reduce the consumption of fuel in the Cornish boilers at least 6 per cent., whereas by the following report of one of the first houses in Manchester I saved 16 per cent., and on short copper pans from 20 to 40 per cent.

"Primrose, 17th July, 1843.

"Mr. John Chanter.

"Sir,—We have carefully and attentively examined the evaporation of water by your patent furnace, which we now send you, in accordance with our agreement with you, to economize 10 deg. in fuel on our steam boilers, and 20 deg. in our drying and puddling stores and other small boilers. The result, we are happy to say, is greatly in favour of your furnaces, as may be seen by perusing the accompanying statement, giving an average of more than 16 deg. on our steam boilers, of 30 deg. on our single plate, and nearly 38 deg. upon our blanket drying stores.

"We are, Sir, yours respectfully,

"THOMSON, BROTHERS, & SONS,

"Per James Bold."

Mr. J. P. Booth exhibited his model of a machine for raising and lowering miners, raising minerals, and ventilating mines, which he has patented. It consists principally of a revolving incline plane, or a continuous screw shaft, the threads or surfaces of which are made to act against the periphery of wheels extended from a carriage in which the miners or heavy bodies are placed, and power is derived for working the ventilating apparatus from the rotation of the screw shaft. The principle being the same as that of the screw jack with diminished friction, it is capable of lifting very great weights. Mr. McSwiney has cast 45 feet of full working size, which is fitted up at the Agricultural Museum, and two men have raised two tons, including the carriage, which proves that if it had steam power, which is intended to be applied to it, it would raise an immense weight in a short time. The miners in Cornwall work 8 hours per day, from one to two of which are laboriously occupied in descending and climbing the ladders, which impairs their strength for the remaining time. This machine will raise and lower the miners in shafts of moderate depth in about 30 min., or 15 min. each way, without any exertion, and with safety not surpassed by any known conveyance, and also raise a large amount of ore. The usual mode of ascending a house or perpendicular height is by pursuing a spiral stair or way; the revolving incline plane effects the same object by bringing the road to the carriage.

Mr. Taylor stated that he had just returned from Cornwall, where he had seen an invention to raise and lower the miners which he thought preferable for deep mines, as he foresaw some difficulty in extending the screw sufficiently to answer in deep mines.

Mr. Booth said that there were but few deep mines, and that his screw could be extended to 150 or 200 fathoms, as a part of the weight could be carried at the top and the remainder at the toe or bottom, in proof of which there are vertical shafts working in Manchester carrying weight on the toe of near 20 tons, and driving heavy and numerous machines with more torsion than will be required by the screw in a mine of 150 fathoms.

Mr. McNeill, the president, stated that a screw shaft on a similar principle to that of Mr. Booth's, is used at the Greenock Railway for raising carriages of six tons each from one level to another. There are but few of the Cornish mines that have a spare shaft, which the reciprocating rods spoken of by Mr. Taylor require, and the cost of sinking one is from 5,000l. to 20,000l., which can only be afforded by very rich mines; as the revolving incline plane will raise the ore as well as the men in their present drawing shafts, both objects will be effected. Reciprocity can be obtained by putting two screws into

one shaft or pit, and working them together by spur wheels; the descending load will assist the ascending one, but the well-known power of the screw is such, that it is considered capable of raising any weight of ore and stuff and men required, without the assistance of a balance, and mechanical arrangements can be made to raise or lower great numbers of men at once.

THE BRITISH MUSEUM.

TO THE EDITOR.

SIR,—The British Museum is a subject which ought to be strongly taken up by every publication which interests itself in the cause of architecture and the fine arts. It is time that the public should now know for certain what the intended façade is to be, and have some positive assurance that it will be in every respect worthy of so important a national edifice. Let us not have a second National Gallery business; and let us also have some pledge beforehand as to what the design really is. There can be but one good reason for now withholding it—the consciousness that it will not bear critical examination, but, on the contrary, would be found very unsatisfactory, a very good reason for the design being suppressed altogether.

Sir R. Smirke seems either to despise public opinion, or else to be dreadfully afraid of exposing himself to it one moment sooner than circumstances compel him, and concealment is no longer possible. He makes a point of never exhibiting any drawings at the Royal Academy, otherwise we might have expected to behold there his *project* for the front of the British Museum. Instead of this he prefers leaving us to conjecture, nor is it difficult to conjecture what sort of a design it will prove. It will be just the same sort of *Grecian* as the Post Office and College of Physicians, or of a piece with the elevations of the interior quadrangle of the Museum itself, decently dull and respectably prosy. Five and twenty years ago such style might have passed with the public for ultra-classical, but now hardly so, at least such is to be hoped. Surely Sir Robert does not shut himself up so entirely in his own studio as not to have suspicion of what is doing out of doors. Does he never deign to look at the drawings in the architectural room at the Royal Academy? If he does not, he is probably not aware that the building now in progress for St. George's Hall, Liverpool, is likely to prove a most formidable rival to his façade for the British Museum, even supposing the latter to be by many degrees superior to anything he has yet produced. Though what grounds there can be for forming any such supposition I know not, since it is a safer and more natural course to draw conclusions as to what a man can do from what he has done, especially when, like the architect of the British Museum, he has been most singularly favoured by opportunities.

Surely the new Palace of Westminster is not of such all-absorbing interest that no one can bestow a thought on any other building, not even on such a truly national one as the British Museum? If nothing can now be done without a commission being formally appointed, then let there be such commission, and that without any loss of time.

It would, moreover, be somewhat satisfactory to know distinctly by whom the design for the façade of the Museum has been approved or sanctioned, or if the architect has been left to have it all his own way.

I remain, &c.

INQUIRES.

DORSETSHIRE.—The parish church of St. Peter's, Swallowcliffe, which has been rebuilt on a new site, and which has for some time past been completed, will be consecrated by the Lord Bishop of Salisbury, for the several offices of religious worship, on Tuesday, the 29th instant. The old church has been pulled down, it having been found much too small for the population of the parish; in addition to which it was almost wholly surrounded with water, and the low and damp situation in which it stood rendered it unhealthy and cold. The present church is built on a larger scale, and on a more elevated site, and will afford accommodation for the greater portion of the inhabitants. The church has been built wholly by voluntary donations and subscriptions from the inhabitants and gentry of the neighbourhood, and on a piece of land which was given by Lord Pembroke.

SOUTH BRENT, SOMERSET.—A handsome new gothic front has been affixed to the organ of the church, according to a design by Mr. Manners, of Bath, and executed by Mr. Smith, organ-builder, of Bristol. A chaste and beautiful gallery has also been erected for the reception of the instrument, in excellent keeping with the ancient and much-admired church. Further improvements in the interior of this fine church are, we hear, in contemplation.—*Bath Chronicle*.